



US009636132B2

(12) **United States Patent**
Nguyen et al.

(10) **Patent No.:** **US 9,636,132 B2**
(45) **Date of Patent:** **May 2, 2017**

(54) **TUMOR DEBULKER**

(56) **References Cited**

(71) Applicant: **MEDTRONIC-XOMED, INC.**,
Jacksonville, FL (US)

U.S. PATENT DOCUMENTS

(72) Inventors: **Thoai Nguyen**, Jacksonville, FL (US);
Phillip J. Berman, Jacksonville, FL
(US); **Dana A. Oliver**, Jacksonville, FL
(US); **Louis M. Shadeck**, Jacksonville,
FL (US)

4,167,943 A 9/1979 Banko
4,274,414 A * 6/1981 Johnson A61B 17/32002
606/170
4,598,710 A † 7/1986 Kleinberg
4,834,729 A 5/1989 Sjostrom
4,850,354 A 7/1989 McGurk-Burleson et al.
RE33,258 E 7/1990 Onik et al.

(Continued)

(73) Assignee: **Medtronic Xomed, Inc.**, Jacksonville,
FL (US)

FOREIGN PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 162 days.

WO 2008124650 A1 10/2008

OTHER PUBLICATIONS

(21) Appl. No.: **14/479,714**

International Search Report and Written Opinion for Application
No. PCT/US2015/48015, mailed Jan. 18, 2016, 15 pages.

(22) Filed: **Sep. 8, 2014**

(Continued)

(65) **Prior Publication Data**

US 2016/0066942 A1 Mar. 10, 2016

Primary Examiner — Julian W Woo

(51) **Int. Cl.**

A61B 17/12 (2006.01)

A61B 17/32 (2006.01)

A61B 17/00 (2006.01)

(74) *Attorney, Agent, or Firm* — Dicke, Billig & Czaja,
PLLC

(52) **U.S. Cl.**

CPC **A61B 17/32002** (2013.01); **A61B**
2017/00477 (2013.01); **A61B 2017/00526**
(2013.01); **A61B 2017/00845** (2013.01); **A61B**
2017/320024 (2013.01); **A61B 2017/320032**
(2013.01); **A61B 2217/005** (2013.01); **A61B**
2217/007 (2013.01)

(57) **ABSTRACT**

A cutting device for use with a powered surgical tool includes an outer blade and an inner blade. The outer blade includes a tubular body, an end cap, and a cutting window defined by a beveled edge on the tubular body and the end cap. The inner blade includes a cutting tip. The inner blade co-axially disposed within the outer blade such that the cutting tip is rotatably exposed at the cutting window. The cutting tip has castellations extending toward the end cap of the outer blade and opposing teeth extending radially toward one another across an opening of the cutting tip.

(58) **Field of Classification Search**

CPC .. **A61B 17/32002**; **A61B 2017/320024**; **A61B**
2017/00845; **A61B 2017/00477**; **A61B**
2217/007; **A61B 2217/005**; **A61B**
2017/320032

See application file for complete search history.

16 Claims, 11 Drawing Sheets

